

Appl. No. 10/659,181
Amdt. dated Dec. 1, 2005
Reply to Office action of Jul.1, 2005

Remarks/Arguments:

Applicants thank Examiner Clark again for her careful and patient examination of this application and clear explanation of the claim rejections. Responsive to the Office action, applicants amend claims 1 and 15 to overcome the rejection:

Claim 1

As amended, claim 1 has the added limitation that:

- a. the step of disposing a plurality of balls follows the step of providing a substrate that has holes formed in it and has contact pads form on a first surface; and
- b. the step of disposing the balls is formed from a second surface which is different from the first surface that has the contact pads.

Applicants respectfully submit that the Ohno patent does not disclose either of these elements and therefore does not anticipate claim 1.

Ohno presents 10 examples of attaching balls to a bump sheet; but not one of the methods discloses the two sequential steps of claim 1. The specific example cited in the Office action refers to Fig 9-11 and example number 9. The description of example 10 is copied below:

EXAMPLE 9

Balls having a mean diameter of 90 μ m...were produced 80 μ m holes were bored in a polyimide film of 40 μ m thickness by a laser at positions corresponding to the positions of the electrodes of ... semiconductor chip. The gold balls were fixed into the holes. ...

First, as shown in FIG. 9, there was prepared a substrate including a pile of a polyimide film 40 formed with holes at positions where the gold balls are to be arranged and a thin stainless steel plate 22 which is placed on the rear side of the film 40 and provided with holes formed at the same positions as those formed in the film 40. ... [T]he rear side of the thin stainless steel plate 22 was evacuated so that the gold balls 6 are attracted to the hole positions of the polyimide film 40. Next, ... the gold balls were mechanically pushed from the front side of the film 40 into the holes of the plate 22 by means of a press 53 so that the head portions of the balls were protruded by about 5 μ m from the opposite surface of the tape. ...

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Next, one surface of this bump sheet or the sheet surface on the side having the bumps protruded by about 5μm therefrom was copper-plated to form leads 2 in a predetermined pattern...

It is clear that example number 9, and all other 9 examples in the Ohno patent do not disclose the two elements in claim 1, namely, a step of providing a substrate with holes and contact pads before disposing the balls because the copper-plated leads are formed on the pile of polyimide sheets after the balls are disposed on it, not before; and the balls are not disposed from a side of the substrate different from the side of the contact pads because again there is no contact pads on the substrate before the balls are disposed on it.

Because the Ohno patent does not disclose all elements in claim 1, applicants respectfully submit that it does not anticipate claim 1 and claim 1 stands patentable.

Claims 2, 3, and 4

Claims 2, 3, and 4 properly depend from claim 1 with additional limitation on the substrate; they stand patentable at least by virtue of their dependence.

Claims 7, 8, and 22

Claims 7, 8 and the newly inserted claim 22 also properly depend from claim 1 with additional limitation on the force applied to the balls and the punch that applies the force; they also stand patentable at least by virtue of their dependence.

Claim 15

As amended, claim 1 has the same added limitation as in claim 1, namely:

- a. the step of disposing a plurality of balls follows the step of providing a substrate that has holes formed in it and contact pads form on a first surface; and
- b. the step of disposing the balls is formed from a second surface that is different from the first surface that has the contact pads.

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For the same reason as presented relating to claim 1, the Ohno patent does not disclose either of the two elements in claim 15 and therefore it does not anticipate claim 15.

Claims 16-20

Claims 16-20 properly depend from claim 15 and therefore stand patentable at least by virtue of their dependence.

Claim 21

Claim 21 requires the step of placing balls on a substrate that has holes and contact pads. As presented above relating to claims 1 and 15, the Ohno patent does not disclose such a substrate. The substrates in the Ohno patent, in all cases, are free of contact pads at the time the balls are placed to the substrate. Therefore, applicants respectfully submit that Ohno does not anticipate claim 21.

In summary, applicants respectfully submit that the application is in allowable form; pending claims all distinguish over the Ohno patent because it does not disclose the sequence of steps in the pending claims. Applicants respectfully request further examination of this application and timely allowance of all pending claims.

Respectfully submitted,



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